SLOVENSKI STANDARD
SIST EN 2336:2001

01-januar-2001

Aerospace series - Bearings, spherical plain in steel with assembly slots - Dimensions and loads

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Luft- und Raumfahrt - Gelenklager aus Stahl mit Einführnuten - Maße und Belastungen

Série aérospatiale - Rotules lisses en acier avec encoches d'assemblage - Dimensions et charges

Ta slovenski standard je istoveten z: **EN 2336:1988**

ICS:

49.035	Sestavni deli za letalsko in vesoljsko gradnjo	Components for aerospace construction

SIST EN 2336:2001 **en**

EUROPEAN STANDARD

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EN 2336

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Key words : Aeronautical industry, plain bearing, spherical bearings, steel, dimensions, static loads.

English version

Aerospace series
Bearings-spherical plain in steel
with assembly slots
Dimensions and loads

Série aérospatiale
Rotules lisses en acier
avec encoches d'assemblage
Dimensions et charges

Luft- und Raumfahrt
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Maße und Belastungen

This European Standard was accepted by CEN on 1987-11-16. CEN members are bound to comply with the requirements of CEN Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to CEN Central Secretariat has the same status as the official versions.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat : Rue Bréderode 2, B—1000 Bruxelles

Brief history

This European Standard has been prepared by the European Association of Aerospace Manufacturers (AECMA).

After enquiries and votes carried out in accordance with the rules of this Association, this draft has successively received the approval of the National Associations and the Official Services of the member countries of AECMA, prior to its presentation to C.E.N.

According to the Common CEN/CENELEC Rules, following countries are bound to implement this European Standard:

1 Scope

This standard specifies the characteristics of spherical plain bearings :

- with assembly slots
- with and without grease holes
- with and without lubrication grooves
- in steel

intended for fixed and moveable structural elements in aircraft and their control mechanisms.

2 Field of application

The spherical plain bearings defined by this standard are to be used within the temperature range -54 to +150 °C.

However, because of lubrication with the following greases (see EN 2337) :

- ester type extreme pressure grease (code A) limits of use -73 to +121°C or
- synthetic hydrocarbon extreme pressure grease, for general purpose (code B) limits of use -54 to +177 °C ,

their field of application in the case of lubrication with grease A is limited to + 121 °C.

In both cases one of the spherical surfaces shall be smeared with a dry film lubricant (anti-seize treatment).

3 References

ISO 1132-1980, Rolling bearings - Tolerances - Definitions

EN 2031 , Steel FE-PL31 - Hardened and tempered - Bars - Aerospace series

EN 2337 , Aerospace series - Spherical plain bearings - Technical specification [1)]

4 Symbols and definitions

The tolerance symbols and their definitions are in accordance with ISO 1132.

Δ_{dmp} : difference between a single plane mean bore diameter and the nominal bore diameter

Δ_{ds} : difference between a single bore diameter and the nominal bore diameter

Δ_{Dmp} : difference between a single plane mean outside diameter and the nominal outside diameter

Δ_{Ds} : difference between a single outside diameter and the nominal outside diameter

α : maximun angle of tilt of the outer ring with respect to the inner ring with the spherical raceway of the outer ring being completely in contact with the inner ring.

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1) In preparation.

5 Materials

Inner ring : Steel EN 2031 - Hardness 60 ≤ HRC ≤ 63

Outer ring : Steel EN 2031 - Hardness 58 ≤ HRC ≤ 62

6 Required characteristics

6.1 Dimensions - Tolerances - Mass

The configuration shall conform with figures 1, 2, 3 and 4.

The dimensions, tolerances and mass shall conform with the values given in table 1.

6.2 Surface roughness

See figure 1.

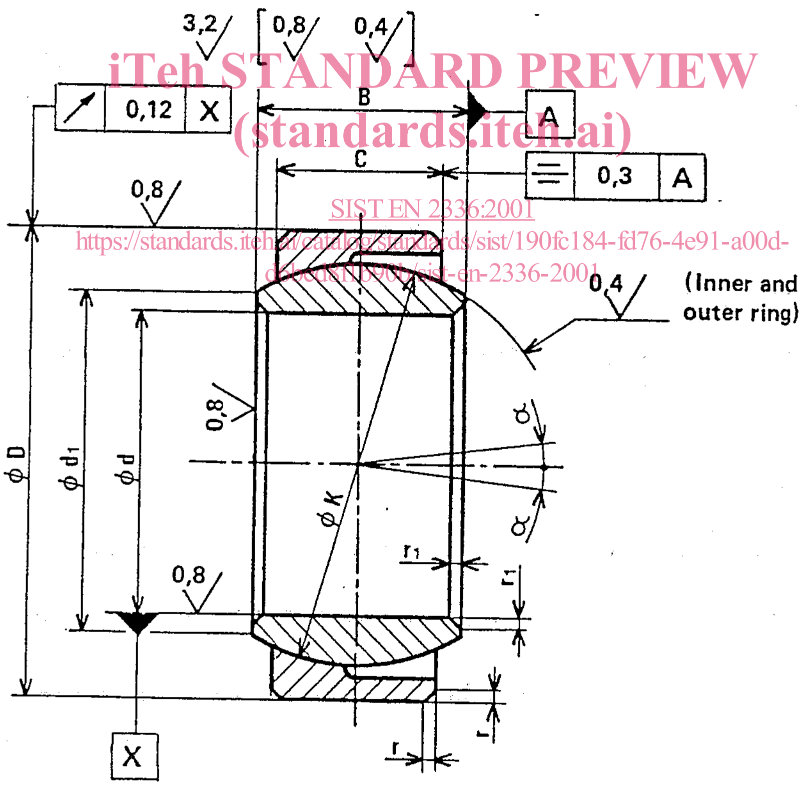
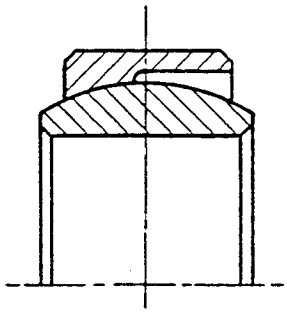
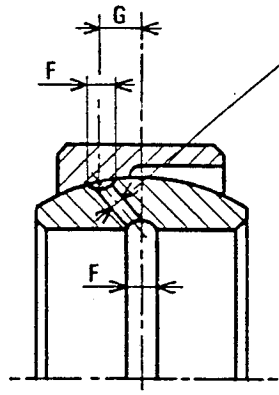


Figure 1



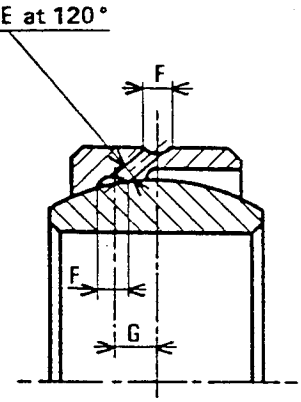
Code E : without grease hole or lubrication groove

Figure 2



Code F : with grease holes in and lubrication grooves on the inner ring

Figure 3



Code G : with grease holes and lubrication grooves on the outer ring

Figure 4

Table 1

Dimensions in millimetres

d		B	C	D	Tolerances μm				d_1	E	F	G	K	r	r_1	α	Mass
Code	Nom.	h11	0 −0,25		Δ_{dmp}	Δ_{Dmp}	Δ_{ds}	Δ_{Ds}	min.	±0,2	±0,2	+0,1 0	≃			min. degree	≃ g
05	5	6	4	14	0 −8	0 −8	+2 −10	+5 −13	7	1)			10	0,3 to 0,8	0,3 to 0,6	13	4
06	6	6	4	14					8								
08	8	8	5	16					10				13			15	7
10	10	9	6	19		0 −9		+6 −15	13				16		0,5 to 0,8	12	11
12	12	10	7	22			+3 −11		15				18	0,5 to 1,2		11	15
15	15	12	9	26					18	1,5	2,8	2,2	22			8	28
17	17	14	10	30		0 −11		+8 −19	20	2		2,5	25	0,6 to 1,5	0,7 to 1,1	10	44
20	20	16	12	35	0 −10		+3 −13		24		2,9	3	29			9	60
25	25	20	16	42					29	2,5	4	4	36			7	105
30	30	22	18	47					34			4,5	41			6	145
35	35	25	20	55	0 −12	0 −13	+3 −15	+10 −23	39			5	47				210
40	40	28	22	62					45			5,5	53	0,8 to 1,7	1,2 to 1,7	7	285
45	45	32	25	68					50			6,2	60				420
50	50	35	28	75					55			7	66			6	515
60	60	44	36	90	0 −15	0 −15	+4 −19	+13 −28	66	3	4,5	9	80				1050
70	70	49	40	105					77			10	92				1510
80	80	55	45	120					88	4	5	12	105				2250

1) Without greases hole or lubrication groove.

6.3 Loads and clearances

They shall conform with the values indicated in table 2.

Table 2

d Code	Permissible static loads kN		Internal axial clearance µm		Internal radial clearance max. µm	
	Radial C_s 1)	Axial C_a 2)	Normal Code N	Reduced Code P	Normal Code N	Reduced Code P
05	12	0,68	30 to 60	1 to 30	15	8
06	16	0,90				
08	26	1,50				
10	45	2,30				
12	60	3,20				
15	90	5,55				
17	110	6,95				
20	160	9,85				
25	270	18,15				
30	380	25,16				
35	500	30	40 to 80	1 to 40	20	10
40	630	36,66				
45	820	48,10				
50	1000	60,96				
60	1600	102,76	50 to 100	1 to 50	25	15
70	2000	127,80				
80	2600	182,80				

1) These loads can only be applied at 90° with respect to the opening of the slots.
2) These loads shall be applied in the direction of the unslotted face of the outer ring.